

REMARKS

Claims 1-3, 21, and 35 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,549,361 (Sorenson). The Examiner has withdrawn claims 4-20 and 22-34 from further consideration pursuant to the Restriction Requirement of September 13, 2000.

The Applicants have carefully reviewed the Office Action mailed December 6, 2000, and respectfully submit the foregoing amendments and following remarks in response thereto.

The specification has been amended to correct minor informalities found during review of the application. In particular, some changes were made in the text and reference numbers to correct for typographical and grammatical errors. Reference number 76 was changed to "75" on page 67, reference number 32 was changed to "34" on page 68, reference number 108 was changed to "109" on page 102, and reference number 75 was changed to "74" on page 110.

Claim 1 is amended to include the limitations of dependent claim 2 and to further recite a sensing device (*see, e.g.*, Fig. 15 (element 156)). Claim 2 is canceled without prejudice to the subject matter contained therein. Dependent claim 3 is amended in a manner consistent with amended claim 1. Claim 35 is amended to further recite a sensing device. New claims 36-40 have been added. No new matter is added. Accordingly, claims 1, 3, 21, and 35-40 are now pending in the application.

1. Claims 1, 3, 21 and 35, as Amended, Are Patentable Under §102(b) Over Sorenson.

The Applicants respectfully traverse the § 102(b) rejection of amended claims 1, 3, 21 and 35 as anticipated by Sorenson on the grounds that this reference does not disclose all the features of the present invention.

Claim 1 sets forth, *inter alia*, "a sensing device for detecting at least one of a brake operating condition quantity indicative of an operating condition of said brake operating member and a vehicle running condition quantity indicative of a running condition of an automotive vehicle having a wheel which is braked by said brake cylinder." Similarly, claim 35 sets forth, *inter alia*, "a sensing device for detecting a brake operating condition quantity indicative of an operating condition of said brake operating member."

Sorenson does not disclose a sensing device used to detect a brake operating condition

quantity and/or a vehicle running condition quantity, and controlling the force generated by the brake force assisting device in accordance with at least one of these quantities.

Accordingly, because Sorenson does not disclose all the limitations of independent claims 1 and 35, Sorenson does not anticipate claims 1 and 35 under § 102(b). The Applicants respectfully request the pending § 102(b) rejections of claims 1 and 35, and the § 102(b) rejections of claim 1's dependant claims 3 and 21, be withdrawn.

Conclusion


In view of the foregoing amendments and remarks, the Applicants respectfully submit that claims 1, 3, 21 and 35-40 are in condition for allowance, respectfully solicit issuance of a Notice of Allowance for claims these claims.

The Examiner is invited to contact the undersigned at (202) 220-4232 to discuss any matter concerning this application. The Office is authorized to charge any fees under 37 C.F.R. 1.16 or 1.17 related to this communication to Deposit Account No. 11-0600.

Respectfully submitted,

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MARKED-UP AMENDED SPECIFICATION PARAGRAPHS AND CLAIMS

Paragraph running from page 67-68:

The servo system of the present hydraulically operated braking system includes a pump 70, an accumulator 72, a pressure increase control valve 74, a pressure reduction control valve 75[6], a master reservoir 76 and an assisting cylinder 78. The pressure increase control valve 74 and the pressure reduction control valve 75 are controlled by a pressure control device 80 which is constituted principally by a computer. It will be understood from the following description that the above-indicated elements 70-78 and a portion of the pressure control device 80 assigned to control the control valves 74, 75 cooperate to constitute an assisting device 81 for boosting a drive force to be applied to the pressurizing piston 3[2]4 of the master cylinder 10. It will also be understood that the pressure increase control valve 74 and the pressure reduction control valve 75 constitute a major portion of a solenoid-operated pressure control valve device 82 of the assisting device 81.

Paragraph running from page 101 to 103:

It will be understood from the foregoing description of the [present] first embodiment of the invention that a portion of the pressure control device 80 assigned to control the pressure increase and pressure reduction control valves 74, 75 constitutes a major portion of a control valve control device for controlling the control valves 74, 75[.]. [while t] The solenoid-operated shut-off valve 108 and a portion of the pressure control device 80 assigned to open the shut-off valve 108 constitute an emergency fluid communicating device for effecting fluid communication between the pressurizing chamber 32 and the assisting pressure chamber 100 in the even of an abnormality of the assisting device 81. Since the fluid pressurizing characteristic of the master cylinder 12 is controlled by adjusting the operating stroke S [by] with the stroke adjusting device 128, the stroke adjusting device 128 may be considered to be one form of [a] master cylinder characteristic control device for controlling the fluid pressurizing characteristic of the master cylinder 12. Since the fluid pressurizing characteristic of the master cylinder 12 can also be controlled by controlling the assisting drive force produced by the assisting device 81, the assisting device 81 including the assisting drive force control device 10[8]9 may be considered to be another form of [the] master cylinder characteristic control device. While [both of] the assisting device 81 and the stroke

adjusting device 128 together may be considered to be the master cylinder characteristic control device, each of these two devices 81, 128 may also be considered to be the master cylinder characteristic control device, since either the device 81 or the device 128 alone can change the fluid pressurizing characteristic of the master cylinder 12. It will further be understood that the stroke adjusting cylinder 64 [having] which has the volume control chamber 118 and [a] the portion of the pressure control device 80 assigned to control the fluid pressure in the chamber 118 constitute a master cylinder fluid amount control device for controlling the amount of [the] fluid in the master cylinder 12 to adjust the operating stroke S of the brake pedal 10[.], [and that t]The shut-off valve 62 and [a] the portion of the pressure control device 80 assigned to close the shut-off valve 62 constitute an emergency master cylinder disconnecting device for disconnecting the variable-volume chamber 116 and the master cylinder 12 from each other in the even of an abnormality [of] in the assisting drive force control device 109.

Paragraph running from page 109-110:

A hydraulically operated braking system according to a fifth embodiment of the present invention will be described [by] with reference to Fig. 15, wherein the master cylinder 12 incorporates an assisting cylinder within a single cylinder housing. This arrangement has [an] the advantage of a reduced number of parts [of] in the braking system. Described in detail, the master cylinder 12 has a pressurizing piston 220 and a piston rod 221 which is fixed to the piston 220 and connected to the brake pedal 10. The piston 220 cooperates with the cylinder housing to define a pressurizing chamber 222 on [one] the side of the piston 220 remote from the piston rod 221, and with an assisting pressure chamber 224 on the other side of the piston 220. The assisting pressure chamber 224 is connected to the accumulator 72 through the pressure increase control valve 7[5]4, as in the first embodiment of Fig. 1. An increase of the fluid pressure in the assisting pressure chamber 224 will cause[s] an increase in the force acting on the pressurizing piston 220. Reference numeral 225 denotes a stop which determines a fully retracted position of the pressurizing piston 220.

IN THE CLAIMS:

1. (Once Amended) A hydraulically operated braking system comprising:

a brake operating member operable by an operator;

a master cylinder including a pressurizing piston operatively connected to said brake operating member and partially defining a pressurizing chamber, said pressurizing piston being moved by said brake operating member to pressurize a fluid in said pressurizing chamber;

a brake cylinder actuated by the pressurized fluid received from said master cylinder;

[and]

a sensing device for detecting at least one of a brake operating condition quantity indicative of an operating condition of said brake operating member and a vehicle running condition quantity indicative of a running condition of an automotive vehicle having a wheel which is braked by said brake cylinder; and

an assisting device for applying to said pressurizing piston an assisting drive force which is different than a primary drive force to be applied to said pressurizing piston on the basis of a brake operating force acting on said brake operating member, said assisting device being electronically controllable to control said assisting drive force,

and wherein said assisting device comprises an assisting drive force control device electrically operable to control said assisting drive force on the basis of said quantity detected by said sensing device.

3. (Once Amended) A hydraulically operated braking system according to claim 1, wherein said assisting device further comprises:

an assisting cylinder including an assisting piston operatively connected to said pressurizing piston, said assisting cylinder having an assisting pressure chamber which is partially defined by said assisting piston;

a high-pressure source;

a reservoir; and

a solenoid-operated pressure control valve device connected to said high-pressure source, said reservoir and said assisting pressure chamber, for selectively supplying the fluid from said high-pressure source to said assisting pressure chamber and returning the fluid from

said assisting pressure chamber to said reservoir[; and],

and wherein said assisting drive force control device includes a control valve control device for controlling said solenoid-operated pressure control valve device to control a pressure of the fluid in said assisting pressure chamber.

35. (Once Amended) A hydraulically operated braking system comprising:

a brake operating member operable by an operator;

a master cylinder including a cylinder housing and a pressurizing piston operatively connected to said brake operating member and cooperating with said cylinder housing to define a pressurizing chamber, said pressurizing piston being moved by said brake operating member to pressurize a fluid in said pressurizing chamber;

a brake cylinder actuated by the pressurized fluid received from said master cylinder;

[and]

a sensing device for detecting a brake operating condition quantity indicative of an operating condition of said brake operating member; and

a master cylinder characteristic control device for controlling an amount of the fluid in said pressurizing chamber of said master cylinder, on the basis of said brake operating condition quantity, to thereby control a relationship between a position of said pressurizing piston relative to said cylinder housing and the fluid pressure in said pressurizing chamber, for controlling a fluid pressurizing characteristic of said master cylinder.

36. (New) A hydraulically operated braking system according to claim 1,

wherein said sensing device is operable to detect, as said brake operating condition quantity, at least one of a quantity corresponding to an operating amount of said brake operating member and a quantity corresponding to a rate of change of said operating amount, and said assisting drive force control device is operable to control said assisting drive force on the basis of said at least one of said quantities corresponding to said operating amount and said rate of change of said operating amount.

37. (New) A hydraulically operated braking system according to claim 36,

wherein said sensing device includes at least one of a force sensor for detecting a quantity corresponding to an operating force of said brake operating member and a stroke sensor for detecting a quantity corresponding to an operating stroke of said brake operating member, said assisting drive force control device is operable to control said assisting drive force on the basis of at least one of said quantities corresponding to said operating force and said operating stroke of said brake operating member.

38. (New) A hydraulically operated braking system according to claim 37,

wherein said assisting drive force control device is operable to control said assisting drive force on the basis of both of said quantities corresponding to said operating force and said operating stroke of said brake operating member.

39. (New) A hydraulically operated braking system according to claim 35,

wherein said sensing device includes at least one of a force sensor for detecting a quantity corresponding to an operating force of said brake operating member and a quantity corresponding to a stroke sensor for detecting an operating stroke of said brake operating member, and said master cylinder characteristic control device is operable to control the amount of the fluid in said pressurizing chamber of said master cylinder on the basis of at least one of said quantities corresponding to said operating force and said operating stroke of said brake operating member.

40. (New) A hydraulically operated braking system according to claim 39,

wherein said master cylinder characteristic control device is operable to control the amount of the fluid in said pressurizing chamber of said master cylinder on the basis of both of said quantities corresponding to said operating force and said operating stroke of said brake operating member.